In the outstanding Official Action, Claims 1, 2, 15, 16, and 29 were rejected under 35 U.S.C. §102(b) as being anticipated by Ono (JP-8-297413-A), Claims 1, 3, 5, 7, 12, 14, 15, 17, 19, 21, 28, and 29 were rejected under 35 U.S.C. §102(b) as being anticipated by Shin et al (U.S. Patent No. 5,689,784, Shin), and Claims 4, 6, 8-11, 13, 18, 20, 22-25, and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Shin in view of Kinoshita (U.S. Patent No. 5,086,728). The Office Action Summary indicates that all of Claims 1-20 are rejected but no rejection of Claim 26 was included in the Action. In light of the fact that no actual rejection of Claim 26 was made, this independent claim is considered to stand allowed.

Before turning to the outstanding prior art rejections, it is believed that a brief review of the present invention would be helpful. In that regard, the present invention is directed to an image forming apparatus having a developing device with a conveyor or member that conveys one-component developer to a closely spaced latent image bearing member to perform a two-level developing operation, which operation is defined in the specification to be "a developing operation according to two-level binary image density and formation for each pixel." See page 11, lines 1-6 of the specification for further details. As further described on this page, to overcome various problems, one aspect of the present invention involves a developing condition which is set such that the amount of toner adhering to an image area on a photoconductive surface portion of the latent image bearing member is saturated. Accordingly, even if image potential is increased above a threshold value, the saturated amount of toner does not increase.

Other aspects of the present invention include ensuring that the amount of a one component developer adhering to the conveyor surface portion is about 0.5 mg/cm^2, and that the absolute value of the predetermined amount of charge of the one-component developer is equal to or less than about 10 $\mu C/g$.

In yet other aspects of the present invention, the adhering amount of the one-component developer on the conveyor is formed by a thin layer forming device so as to be from about 1 to about 1.5 times the thickness of the diameter of toner particles in the one-component developer and the movement of one-component developer from the conveyor member to a development region on the latent image bearing member is across a gap between the conveyor surface portion and the opposed photoconductive surface portion that is equal to or less than about 150 μm.

Other aspects also include applying a developing bias voltage to the conveyor member from a voltage source that is made up of an AC voltage superimposed on a DC voltage. The AC voltage has a peak-to-peak voltage value of from 600 to 1200 volts and a frequency from 2 to 6 kHz.

Another aspect includes using a thin layer forming device that protrudes from a holder with a length of about 10-15 mm and that contacts the developer bearing member with a contact pressure of about 10 to about 150 g/cm. The conveyor member is given a surface roughness of about 1 to about 4 μm RZ.

Each of the aspects noted above produce beneficial results discussed in the specification, for example, relative to the comparative examples given by Figures 1, 3, 4, and 5.

Turning to the outstanding rejection over Ono it is noted that the PTO has supplied Applicants with only a short English abstract of this large reference. This English abstract does not appear to support to the PTO position that this reference would anticipate any of Claims 1, 2, 15, 16, and 29 as indicated in the outstanding action.

In this regard, the "Constitution" portion simply indicates that a toner layer is formed on a toner carrier opposed to an electrostatic latent image carrier so that an electrostatic latent

image is provided. There is no hint here, or elsewhere in the Action, as to how the PTO considers this reference to teach all of the claimed limitations including, for example, "the developing device configured to perform a two-level developing operation with a one-component developer including toner particles." In this regard, it is well established that the PTO must use definitions for claim terms that are present in the specification. See In re Zletz, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). Thus, since page 11, lines 1-3 provide a clear definition of what the claim language as to a "two-level developing operation" means in terms of a two-level binary image density formation for each pixel, this is the definition of the term that must be used. However, it is clear that Ono includes no such two-level developing operation in the discussion of the "Constitution" or "Purpose" provided to Applicants.

Moreover, 37 CFR §1.104(c)(2) provides that "[w]hen a reference is complex or shows or describes inventions other than that claimed by the Applicant, the particular part relied on must be designated as nearly as practicable." In addition to the rule, the Reviewing Court of the PTO has noted that "when the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the reference." See In re Rijckaert, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

Not only does the Office Action fail to indicate where it is believed that Ono teaches the "two-level developing operation," there is also no indication where it is believed that this reference teaches the voltage source that must apply the developing bias voltage to the conveyor member when this two-level developing operation is performed so as to move at least some of the one-component developer with a predetermined charge adhering to the conveyor surface portion to the photoconductive surface portion to form saturated amounts of the one-component developer, which are limitations also appearing in Claim 1. The further

limitations of Claim 1 dealing with the saturated amounts not changing with increasing the image potential above a predetermined threshold value have also not been treated in terms of indicating where this teaching appears in Ono.

Instead of explaining where the limitations of Claim 1 are taught by Ono, the Action merely asserts that there is a teaching of the Claim 2 limitation dealing with the amount of component developer adhering to the conveyor being about 0.5 mg/cm^2. However, Claim 2 depends upon Claim 1 and all the limitations of Claim 2 must be shown to be described in the reference in the same arrangement as in the claim. See Connel v. Sears Robuck & Co., 220 USPQ 193 (Fed. Cir. 1983). Also, it is not entirely clear where the PTO finds the teaching of about 0.5 mg/cm^2.

With respect to Claim 15, it is noted that this claim includes "means for applying a developing bias voltage to the means for conveying when the two-level developing operation is performed to move at least some of the one-component developer with a predetermined charge adhering to the portion of the means for conveying to the portion of the means for bearing a latent image to form saturated amounts of the one-component developer" just as Claim 1 did. Once again these limitations have not been address in the Action in terms of indicating were Ono provides such teachings so it can be said to meet these limitations.

The observations made above as to the 0.5 mg/cm^2 of Claim 2 apply equally to Claim 16.

Finally, it is noted that Claim 29 likewise includes requirements as to saturated amounts of the one-component developer on the image areas of the photoconductive surface being formed. Again, the Office Action is silent as to where in Ono such teachings are to be found in violation of the above-noted rule and case law.

Accordingly, since the teachings of Ono have not been shown to disclose an arrangement of the subject matter of Claims 1, 2, 15, 16, and 29, there has been no *prima facie* case of anticipation established and the anticipation rejection of these claims over this reference is respectfully traversed.

Turning to the rejection of Claims 1, 3, 5, 7, 12, 14, 15, 17, 19, 21, 28, and 29 as anticipated by Shin, it is again noted that the "two-level developing operation" of these claims has not been shown to be taught by Shin. In addition, this rejection again fails to establish where the limitations recited by at least the independent Claims 1, 12, 14, 15, 28 and 29 are taught by Shin. Accordingly, the rejection does not comply with 37 CFR §1.104 or the above-noted Rijckaert decision.

Thus, while there is a listing of Claim 1 limitations, there is no explanation as to where the various limitations can be found in the reference. It is not until page 5 of the rejection that the limitation of Claims 7 and 21 (as to the gap between the development region and the conveyor surface being less than or about equal top 150 μm) is discussed relative to col. 5, lines 61-63 of Shin. While it is clear that Shin teaches a gap of 50-200 μm, it is likewise clear that there are no teachings in Shin as to the above-noted details of the two-level developing operation or the providing of saturated amounts of the one-component developer. Accordingly, it is clear that no anticipation can be said to exist relative to Claims 1, 3, 7, 12, 14, 15, 17, 19, 21, 28, and 29, which all include one or both of the above-noted limitations.

Moreover, the rejection attempts to mix and match the prior art teaching of col. 3, lines 12-14 that is discredited as inferior by Shin with the Shin inventive feature of col. 5, lines 27-30. In this respect, Shin makes it clear that a toner charge of 10 μC/g or below is inferior because a smooth image cannot be obtained due to tonal gradation. See col. 3, lines

11-15. It is also noted that this amount of charge applies to the use of a developing roller that is a hard roller and not the soft roller used with Shin. Thus, the discussion of col. 5, lines 27-30 and that of col. 3, lines 12-14, compares apples and oranges. There is no suggestion to be found in Shin that these two features are to be arranged in one device. And, accordingly, anticipation cannot be based upon these two disparate and individual features. Note again the above cited Sears decision. In addition, see Ex parte Osmond, 191 USPQ 334, 336 (Bd. Pat. App. & Int. 1973) indicating that isolated discloses lacking a teaching as to their combination do not constitute anticipation.

Turning to the rejection of Claims 4, 6, 8-11, 13, 18, 20, 22-25, and 27, it is first noted that Kinoshita cures no other deficiencies noted above as to Shin. Moreover, the attempt to take the thin layer forming device of Kinoshita that contact the developer bearing member thereof with the contact pressure specified at col. 6, line 65 - col. 7, line 3 out of context ignores that these teachings apply to a developing sleeve that is of the hard type which is not the subject matter of concern to Shin. In this regard Shin differentiates hard and soft rollers at col. 3, lines 8-67, the superiority of the soft roller as the roller used with his device. Note, for example, col. 4, lines 10-14. The reasonable basis why the pressure used to contact hard roller would be used to contact to soft one of Shin is not addressed. Accordingly, no *prima facie* case has been set forth.

Finally, it is noted that the outstanding Action improperly suggests that the remaining limitations of Claims 4, 6, 8-11, 13, 18, 20, 22-25 and 27 dealing with, for example, surface roughness, values of peak-to-peak voltages and frequencies, and the protruding length of the thinning member, are all matters of routine design. However, the reliance upon In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) is inappropriate since it is clear that the prior art gives no indication that optimizing these particular variable leads to any particular desired

result. In this regard, note In re Antonie, 195 USPQ 6 (CPA 1977) which indicated that there must be a showing that the prior art recognized that the variable to be optimized was a result-effective variable. Because there has been no such showing here, there can be no optimization of a result-effective variable that would involve only routine skill in the art.

Accordingly, the rejection of Claims 4, 6, 8-11, 13, 18, 20, 22-25, and 27 as being obvious over Shin in view of Cyanocitta is also traversed.

In view of the fact that the outstanding Office Action fails to establish a *prima facie* case of unpatentability as to any of the rejected claims, and because no other issues remain outstanding, it is believed that the present application is clearly in condition for formal allowance and an early and favorable action to that effect is, therefore, respectfully requested.

Respectfully submitted,

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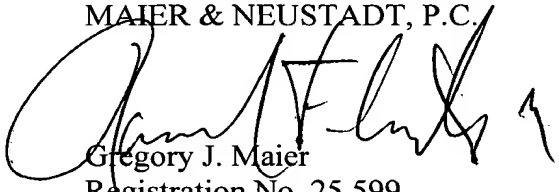

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IN THE CLAIMS

Please amend Claims 12 and 14 as follows:

--12. (Amended) An image forming apparatus, comprising:

a latent image bearing member having a potential thereon; and

a developing device [for performing] configured to perform a two-level developing operation with a one-component developer including toner particles, the developing device including,

a conveyor member configured to convey the one-component developer to a developing region where part of the developer-bearing member is closely spaced next to a part of the latent image bearing member;

a thin layer forming device configured to form the one-component developer on the conveyor member into a uniform thin layer having a height corresponding to 1 to 1.5 times a diameter of the toner particles of the one-component developer.

14. (Amended) An image forming apparatus, comprising:

a latent image bearing member having a photoconductive surface with a latent image including image areas, at least some of said image areas having different image potential values thereon; and

a developing device [for performing] configured to perform a two-level developing operation with a one-component developer including toner particles, the developing device including,

a conveyor member configured to convey the one-component developer from a one-component developer supply to deliver the one-component developer with a predetermined amount of charge to a developing region where the conveyor member is closely spaced from and opposed to the latent image bearing member, and

a thin layer forming device to form the developer on the conveyor member into a uniform thin layer,

wherein an absolute value of the predetermined amount of charge of the one-component developer is equal to or less than about 10 μC/g.